RELIABILITY REPORT FOR

MAX40088

WAFER LEVEL DEVICES

October 10, 2017

MAXIM INTEGRATED

160 RIO ROBLES

SAN JOSE, CA 95134

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Conclusion

The MAX40088 successfully meets the quality and reliability standards required of all Maxim Integrated products. In addition, Maxim Integrated's continuous reliability monitoring program ensures that all outgoing product will continue to meet Maxim Integrated's quality and reliability standards.

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I. Device Description

A. General

The MAX40075/MAX40088 are wideband, low-noise, low-input bias current operational amplifiers offering rail-to-rail outputs and single-supply operation down to 2.7V. They draw 2.2mA of quiescent supply current per amplifier when enabled. Ultra-low distortion (0.0002% THD+N), as well as low input voltage-noise density (4.2nV/√Hz) and low input current-noise density (0.5fA/√Hz). The low input bias current and low noise together with the wide bandwidth will suit transimpedance amplifiers and imaging applications. For power conservation, the MAX40075/MAX40088 offer a low-power shutdown mode that reduces supply current to 0.1µA and places the amplifiers outputs into a high impedance state. These amplifiers have outputs which swing rail-to-rail and their input common-mode voltage range includes ground. The MAX40075 is unity-gain stable with a gain-bandwidth product of 10MHz. The MAX40088 is gain-of-5 stable with a gain-bandwidth product of 42MHz.

II. Manufacturing Information

A. Description/Function:	10MHz/42MHz Low Noise, Low Bias Op-Amps	
B. Process:	S18	
C. Fabrication Location:	USA	
D. Assembly Location:	Taiwan	Malaysia, Thailand
E. Date of Initial Production:	July 7, 2017	

III. Packaging Information

A. Package Type:	6-bump WLP	6-pin SOT23
B. Lead Frame:	N/A	Copper
C. Lead Finish:	N/A	100% matte Tin
D. Bondwire:	N/A (N/A mil dia.)	Au (1 mil dia.)
E. Assembly Diagram:	#05-100662	#05-100679
F. Flammability Rating:	Class UL94-V0	Class UL94-V0
G. Classification of Moisture Sensitivity per JEDEC standard J-STD-020-C	Level 1	Level1
H. Single Layer Theta Ja:	N/A°C/W	N/A°C/W
I. Single Layer Theta Jc:	N/A°C/W	N/A°C/W
J. Multi Layer Theta Ja:	98.06°C/W	115°C/W
K. Multi Layer Theta Jc:	N/A°C/W	80°C/W

IV. Die Information

A. Dimensions:	52.7559X29.9213 mils
B. Passivation:	Si_3N_4/SiO_2 (Silicon nitride/ Silicon dioxide)
C. Interconnect:	Al/0.5%Cu with Ti/TiN Barrier
D. Minimum Metal Width:	0.23 microns (as drawn)
E. Minimum Metal Spacing:	0.23 microns (as drawn)
F. Isolation Dielectric:	SiO_2
G. Die Separation Method:	Wafer Saw

V. Quality Assurance Information

A. Quality Assurance Contacts:	Eric Wright (Reliability Engineering) Brian Standley (Manager, Reliability) Bryan Preeshl (Vice President of QA)
B. Outgoing Inspection Level:	0.1% for all electrical parameters guaranteed by the Datasheet. 0.1% for all Visual Defects.
C. Observed Outgoing Defect Rate:	< 50 ppm
D. Sampling Plan:	Mil-Std-105D

VI. Reliability Evaluation

A. Accelerated Life Test

The results of the 135C biased (static) life test are shown in Table 1. Using these results, the Failure Rate (λ) is calculated as follows:

$$\lambda = \frac{1}{MTTF} = \frac{1.83}{192 \times 4340 \times 67 \times 2}$$ (Chi square value for MTTF upper limit)

(where 4340 = Temperature Acceleration factor assuming an activation energy of 0.8eV)

$\lambda = 16.4 \times 10^{-9}$

$\lambda = 16.4$ F.I.T. (60% confidence level @ 25°C)

The following failure rate represents data collected from Maxim Integrated's reliability monitor program. Maxim Integrated performs quarterly life test monitors on its processes. This data is published in the Reliability Report found at http://www.maximintegrated.com/qa/reliability/monitor. Cumulative monitor data for the S18 Process results in a FIT Rate of 0.40 @ 25C and 6.96 @ 55C (0.8 eV, 60% UCL)

B. E.S.D. and Latch-Up Testing

The OZ46-3 die type has been found to have all pins able to withstand an HBM transient pulse of +/-2500V per JEDEC JESD22-A114. Latch-Up testing has shown that this device withstands a current of +/-250mA and overvoltage per JEDEC JESD78.

Table 1
Reliability Evaluation Test Results

MAX40088

TEST ITEM	TEST CONDITION	FAILURE IDENTIFICATION	SAMPLE SIZE	NUMBER OF FAILURES	COMMENTS
Static Life Test (Note 1)					
	Ta = 135C Biased Time = 192 hrs.	DC Parameters & functionality	67	0	

Note 1: Life Test Data may represent plastic DIP qualification lots.